

## Other barley varieties:

**Innovation** – (2010 BARI) Six-rowed, high yield, and excellent malting quality.

**Pinnacle** – (2007 NDSU) Two-rowed, high yield, excellent quality, and strong straw strength.

**Tradition** – (2003 BARI) Six-rowed, high yield, excellent agronomic performance, and very strong straw.

**Conlon** – (1996 NDSU) Two-rowed, good yield and test weight, and plump kernels.

## Plant Quality Certified Seed

Certified seed is field inspected and lab analyzed to help ensure variety identity, germination, and purity. Contact your local seed producer or dealer for quality certified seed.

Seed producers or dealers can be found in the North Dakota Field Inspected Seeds Directory. The directory is available from the North Dakota State Seed Department (NDSSD), your NDSU Extension Service agent, or under the field seeds program of the NDSSD website. [www.ndseed.com](http://www.ndseed.com)

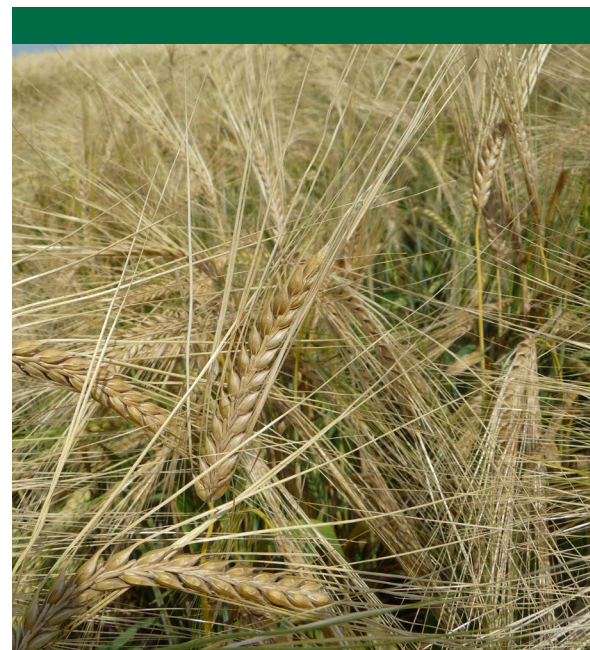


Varieties protected under PVPA with Title V option can only be sold as a certified class of seed. It is the responsibility of the buyer and/or seller to confirm the PVP status of a specific crop variety prior to buying or selling the variety. PVP status information can be obtained from the NDSSD.

# NDSU<sup>®</sup>

## AGRICULTURE

## ND Genesis Two-Rowed Barley



## For information on the availability of Foundation seed contact:

### NDSU Research Extension Centers

Agronomy Seed Farm, Casselton.....(701) 347-4743  
Carrington Research Extension Center....(701) 652-2951  
Hettinger Research Extension Center.....(701) 567-4323  
Langdon Research Extension Center.....(701) 256-2582  
North Central Research Ext. Center.....(701) 857-7679  
Williston Research Extension Center .....(701) 774-4315

Or

NDSU Foundation Seedstocks Project  
(701) 231-8140  
[www.ndfss.com](http://www.ndfss.com)



[www.ndcropimprovement.org](http://www.ndcropimprovement.org)

# ND Genesis Two-Rowed Barley

**ND Genesis** was developed by the NDSU Barley Breeding Program and released by the North Dakota Agricultural Experiment Station in 2015.

ND Genesis is a high yielding two-rowed barley variety. Based on eight years of the barley breeding program's yield trials across ND, ND Genesis has about a 5% yield advantage over Pinnacle. The average yield advantage is over 8% in eastern ND and nearly 3% in western ND.

The test weight of ND Genesis is similar to that of Pinnacle. Results from micro-malting tests show that ND Genesis and Pinnacle have similar percent grain protein.

ND Genesis has medium-strong straw strength and medium-late maturity. ND Genesis is slightly taller than Pinnacle, Lacey, and Conlon. Resistance to lodging is superior to that of Conlon.

ND Genesis has large, plump kernels, and good malt extract values. It accumulates less deoxynivalenol (DON) and has lower beta-glucan values than Pinnacle. ND Genesis accumulates around 20% less DON than Pinnacle. Kernel plumpness of ND Genesis and Pinnacle is similar. This variety has semi-smooth awns, long rachilla hairs, and white aleurone color.

ND Genesis has good disease resistance. It is moderately-resistant/resistant to the net form of net blotch, moderately-resistant to the spot form of net blotch, and moderately-resistant to spot blotch based on greenhouse seedling evaluations. This variety has better resistance to the net and spot forms of net blotch than Pinnacle, and similar resistance to spot blotch as Pinnacle. Compared to Tradition, ND Genesis has better resistance to the net form and spot form of net blotch.

The improved foliar disease resistance and yield potential of ND Genesis as compared to Pinnacle make it a possible replacement for Pinnacle.

ND Genesis seems adapted to all areas of ND and adjacent parts of MN, MT, and SD where barley is grown. Its large kernel and low grain protein traits may be helpful when growing malting barley in environments where moisture stress occurs after heading. Besides the Upper Midwest production area, ND Genesis also has some promise in the spring barley production areas of the eastern USA where growers producing barley for the craft brewing market have been growing Pinnacle because of its low protein.

To help ensure genetic purity, ND Genesis will be protected under the Plant Variety Protection (PVP) under Title V and must be sold as a class of certified seed.

## Agronomic comparisons of barley cultivars grown in NDSU barley breeding program yield trials, 2009-2014.

Entry	Yield (bu/acre)	Days to heading*	Height (inches)	Lodging score (1-9)**	Test weight (lb/bu)	Protein (%)	Plump kernels (%)
Environments	46	53	52	18	29	20	27
ND Genesis	97.6	30.8	30.8	3.1	50.2	11.5	92.0
Pinnacle	92.6	30.4	28.8	2.7	50.2	11.5	89.5
Conlon	88.1	27.1	29.3	3.9	53.5	13.1	92.3
AC Metcalfe	87.6	32.0	29.7	4.4	50.1	13.4	82.6
Stellar-ND	91.3	29.0	29.8	3.2	48.8	13.2	86.5
Robust	87.4	29.4	31.9	3.9	49.8	13.7	84.2
Lacey	94.6	28.9	29.4	4.0	50.0	13.5	85.2
Tradition	93.6	29.5	30.6	3.5	49.9	13.5	86.2
Quest	91.8	29.6	31.0	3.9	49.7	13.2	84.1
Celebration	94.4	30.3	29.9	3.5	48.8	13.9	84.6
Innovation	95.4	29.0	29.6	3.1	49.8	13.3	87.3

\*Days after May 31.

\*\*Lodging score of 1 = no lodging and 9 = severe lodging.

## ND Genesis General Characteristics

- High yield
- Low protein
- Good disease resistance
- Large, plump kernels
- Some drought tolerance
- Accumulates less DON than Pinnacle
- Good malt extract values
- Lower beta-glucan values than Pinnacle

## For additional information

about ND Genesis or other barley varieties visit [www.ag.ndsu.edu/varietytrials/barley](http://www.ag.ndsu.edu/varietytrials/barley) or contact the NDSU barley breeder or small grains agronomist at 701-231-7971.





Busch Agricultural  
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# ND GENESIS

SmartBarley



# ND GENESIS



# ND Genesis

**ND Genesis was developed by North Dakota State University and offers farmers in the Midwest a variety that is moderately susceptible to Fusarium head blight (scab), pre-harvest sprout, and leaf diseases. This variety also provides excellent plumpness across many environments and lower protein under drought and heat stress conditions when compared to other 2 row varieties. This protocol is for rainfed ND Genesis.**

The following agronomic, yield and quality, pathology and botanical information on ND Genesis is based on the best available data (ABI Global Barley Research, SmartBarley, US Wheat and Barley Scab Initiative, North Dakota State University, and the Fusarium Head Blight Prediction Center). However, it is up to each farmer to interpret the validity of the contained information and assess how it relates to their own barley growing operations.

**Drought Sensitivity:** ND Genesis has approximately a 3% yield advantage over AAC Synergy in water stress trials, while greater plumpness makes it better at maintaining malting quality under water stress. ND Genesis maintains lower protein than AAC Synergy in water stress trials [1].

**Maturity:** ND Genesis has a medium length maturity similar to AAC Synergy, but later than Tradition or Lacey. It typically heads approximately 65 days after sowing [2].

**Lodging and Straw Length:** ND Genesis lodges 10% more than AAC Synergy, and in general is more susceptible to lodging than Tradition or Lacey. ND Genesis is tall, with an average height of around 28.5 inches. It is approximately an inch taller than AAC Synergy [1]. Plant growth regulators containing the active ingredient Trinexapac-ethyl significantly reduced lodging [1].

**Nitrogen Rate – Yield, Protein, Lodging and Moisture:**

**This Nitrogen recommendation may vary region to region with soil type, temperature, and rainfall. Please use this information as best fits your region. We advise to consult your agronomist if you have any further questions.**

**Yield:** ND Genesis optimized yields between 114-144 lbs/ac total N (Soil test Nitrogen + Rotational Crop credit + applied). ND Genesis demonstrated that over application of nitrogen did not add substantially to yields for a grower. For example, the gain in yield between 80 and 120 lbs/ac nitrogen applied was 5.2 bu/ac. This indicates that the additional 40 lbs/ac n applied will not likely result in substantial ROI for growers [1].

**Protein:** ND Genesis is 0.6% lower protein than AAC Synergy and is in general a lower protein variety compared to other varieties in the Midwest. For every 10 lbs of nitrogen applied, ND Genesis increased its protein by 0.06%. Based on 2 years of data, our recommended nitrogen rate for yield optimization (129 lbs/ac n) would deliver a protein percentage of 12% [1].

**Lodging:** Lodging scores increased by 56% when total nitrogen rates range of 141-169 lbs/ac when compared to lower total nitrogen rates. Applying nitrogen within this range drastically increases a farmer's risk to lodging with ND Genesis [1].

**Moisture:** ND Genesis had 1.25% higher moisture than AAC Synergy, which can force late harvest times. Higher nitrogen rates were associated with higher moistures, so preventing over-application of nitrogen with ND Genesis is critical to controlling moisture levels [1].

**Seeding Rate – Yield, Lodging, and Maturity:**

**Yield:** The recommended seeding rate for yield with ND Genesis is 1 million seeds/ac [1]. Higher seeding rates beyond 1 million seeds/ac did not add more yield, and therefore no ROI to growers [1].

**Lodging:** While lodging increased with higher seeding rates in general, lodging had ~20% more variability at seeding rates greater than 1 million seeds/ac. This indicates that lodging is more unpredictable at higher seeding rates [1].

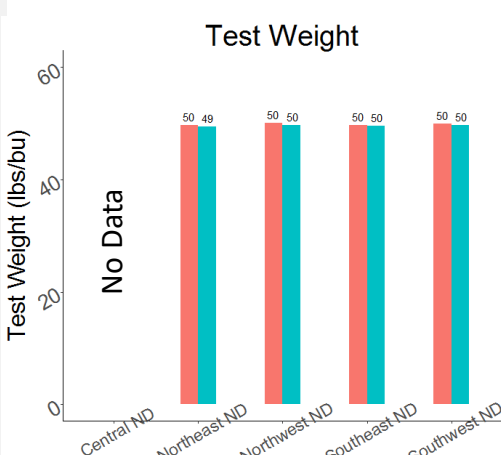
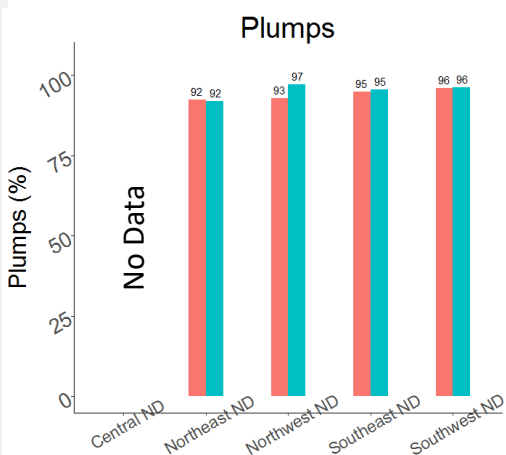
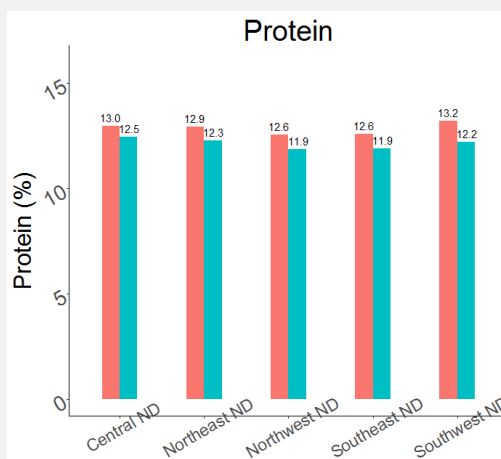
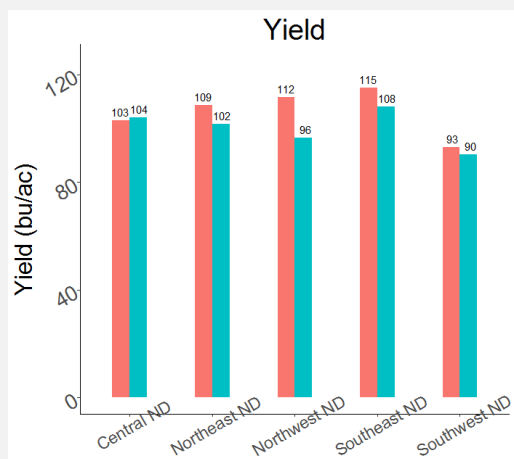
**Maturity:** Higher seeding rates reduced maturity times. However, the benefits of shorter maturity time were not significantly different between 1 and 1.3 million seeds/ac, indicating that benefits from shorter maturity do not require the highest seeding rates and can be achieved at 1 million seeds/ac [1].

**Fusarium Head Blight Management (FHB) – Timing of Application:** When applying a single fungicide application to control FHB, the optimal time is at early full head emergence around Feekes 10.5 of the main stem. [3] When possible, apply a fungicide after the first tillers have emerged from the boot so that both the main stem and early tillers receive fungicide coverage [2].

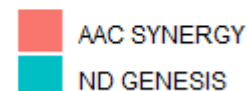
**FHB Management – Crop Rotation and Residue Management:** Planting barley into fields that were previously growing broadleaf crops significantly reduces DON levels compared to corn or small grains. Implement residue management as necessary to decrease risk for FHB [3].

**FHB Management – Integrated Management:** No single method to control FHB is 100% effective. To have the best chance to reduce high DON levels, an integrated approach is recommended. This includes three major decisions: 1) choosing a moderately resistant variety, 2) using appropriate crop rotation and tillage type, 3) applying the Triazole family of fungicides at correct times [3].

# ND Genesis



## Variety Name

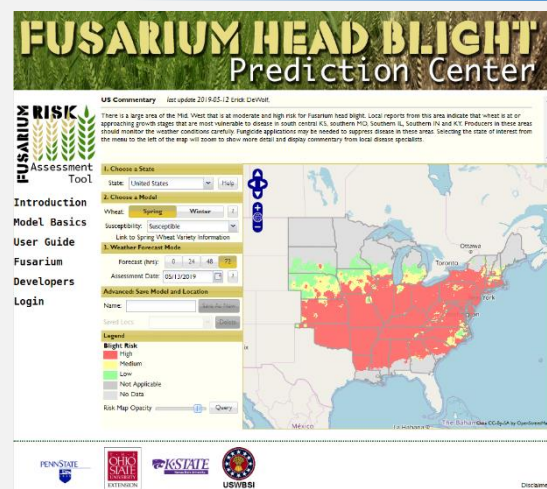


Disease	Resistance Rating
Spot blotch	
Net blotch net form	
Net blotch spot form	
Fusarium head blight	
Pre harvest sprout	
Bacterial Blight	



## Resources Available to American Farmers:

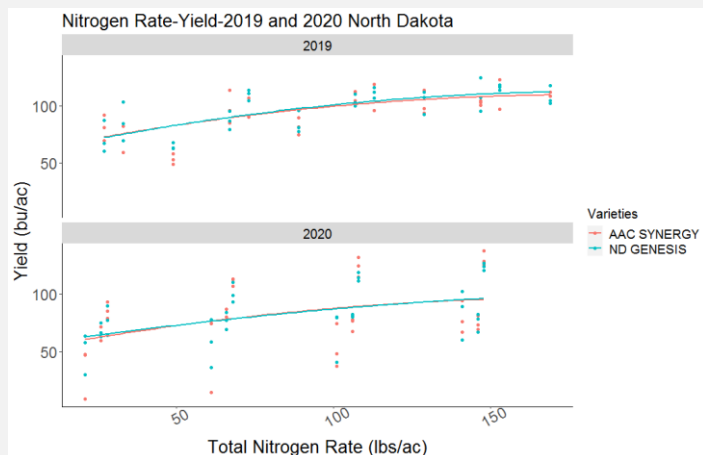
Since 1990, FHB has cost American farmers more than \$3 billion. In response, the US Government, Universities and private industry have invested heavily in preventing FHB. The following internet links provide you access to important management tools and information. 1) Information regarding best management practices, chemical control options, and variety resistance ratings can be found at (<https://scabsmart.org/>); 2) FHB risk forecasting tools can be found at: (<http://www.wheatcab.psu.edu/>). You can receive text alerts that can alert growers to weather conditions which are conducive to FHB infection, allowing sufficient time to provide proactive chemical applications at: ([https://scabusa.org/fhb\\_alerts](https://scabusa.org/fhb_alerts)).



Above: Example of free map you can get daily from the Fusarium Head Blight Prediction Center (<http://www.wheatcab.psu.edu/>). Predictions of risk from FHB in your region can be generated up to 72 hours in advance using weather models [4].

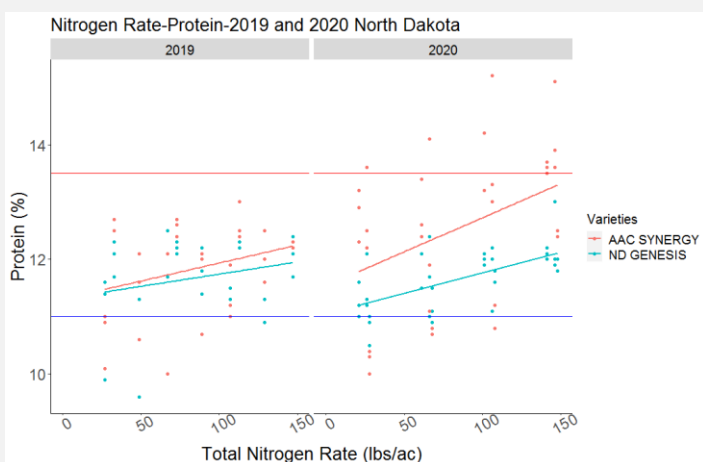
# ND Genesis

These graphs represent the balance between yield, protein, and lodging. Farmers must take all of these into account when considering nitrogen application rates. While there was limited risk from too high of protein in our data for ND Genesis across higher N rates, the risk from lodging increased drastically. Additionally, the diminishing returns from nitrogen to yield should be considered in the economics of farm operations. Most importantly, this information indicates the importance of soil tests prior to planting to optimize fertility on a farm. The difference between good yield-good quality and good yield-bad quality is only 30 lbs/ac of nitrogen.



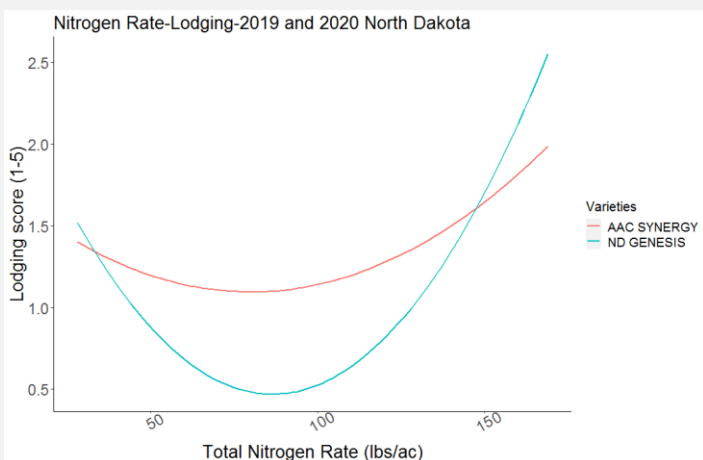
## Nitrogen Rate - Yield

Yield response to total N (applied + soil test + Rotational crop credit). When total nitrogen rates are above 129 lbs/ac, there was a diminishing return to yield while also increasing risk of lodging. There is limited ROI for growers past 129 lbs/ac total N but increased risk of reduced yield due to lodging.



## Nitrogen Rate - Protein

Protein response to total N. Top horizontal red line indicates maximum accepted protein levels (13.5%), and blue horizontal line indicate minimum protein specification at malhouses. ND Genesis inherently has lower protein across total N ranges than many other varieties, including AAC Synergy. While this means it is unlikely to go over protein specification due to N application, the risk from lodging is drastically greater in the past 141 lbs/ac total N.



## Nitrogen Rate - Lodging

Lodging score's relationship to total N. Lodging increased by 56% when total nitrogen rates were between 141-169 lbs/ac when compared to lower total nitrogen rates.

**2011 AMERICAN MALTING BARLEY ASSOCIATION  
PLANT SCALE CANDIDATE**

**SELECTION NO:** 2ND25276

**PARENTAGE:** ND20802/3/ND19922//ND19929/ND20177

**PROJECT LEADERS:** Richard D. Horsley (701) 231-8142

**DESCRIPTION:**

Growth habit:	Spring
Spike type:	Two-rowed, lax
Awn Type:	Semi-smooth
Rachilla hairs:	Long
Aleurone color:	White

**HISTORY:**

2ND25276 is an F<sub>4</sub> selection from the cross ND20802/3/ND19922//ND19929/ND20177 made under the supervision of Dr. Jerry Franckowiak. F<sub>4</sub> rows from this cross were grown at Casselton, North Dakota in 2005 and selected rows were harvested for barley prediction tests. Two head selections from each harvested row were increased in 2005-06 at the winter nursery site near Yuma, Arizona. 2ND25276 first was entered in yield trials at two North Dakota locations in 2006. Based on agronomic and quality attributes, 2ND25276 was advanced to yield trials at four locations in 2007 and the Mississippi Valley Uniform Regional Barley Nursery in 2009. 2ND25276 was entered in the AMBA Pilot Scale Evaluation Program in 2009 for the first time. In the 2009 and 2010 AMBA Pilot Scale Evaluation Program, 2ND25276 was rated satisfactory.

Based on three years (39 station years) of trials in North Dakota, 2ND25276 has yielded similar to that of Pinnacle. ND23898 heads about one-half day earlier than Pinnacle and is about 1.0 in taller than Pinnacle. Resistance to lodging is similar to that of Pinnacle and Lacey. 2ND25276 appears to have similar resistance to spot blotch as Pinnacle, which is not as resistant as Lacey. 2ND25276 has better resistances to spot-form net blotch than Pinnacle and net-form net blotch than Pinnacle and Conlon (data not presented). 2ND25276 accumulates 30% more DON than Conlon, but 11% and 29% less DON than Lacey and Pinnacle, respectively. Results from micro-malting tests show that 2ND25276 has grain protein, kernel plumpness, and diastatic power intermediate to that of Conlon and Pinnacle. Malt extract of 2ND25276 is greater than that of Conlon and similar to that of Pinnacle. Wort protein, S/T, and  $\alpha$ -amylase activity of 2ND25276 are greater than that of Conlon and Pinnacle. Wort  $\beta$ -glucan content of 2ND25276 is less than that of Conlon and intermediate to that of Pinnacle and Lacey.

**ADAPTION AND PROBABLE PRODUCTION AREA:**

2ND25276 is a two-rowed selection targeted for the malting barley production areas in North Dakota, Minnesota, South Dakota, and eastern Montana. Release of 2ND25276 will depend on its acceptability by the malting and brewing industry.

## AGRONOMIC CHARACTERISTICS:

North Dakota Yield Trials (2007-2010)						
Variety	Grain yield (bu/ac)	Days to heading (days after 5/31)	Plant height (inches)	Lodging (1-9)†	Test weight (lb/bu)	DON‡ (ppm)
Station years	39	39	39	16	27	7
2ND25276	108.0	29.1	33.4	3.8	52.6	33.4
Conlon	95.5	25.2	32.3	5.4	53.5	23.1
Pinnacle	108.1	29.4	32.5	3.7	52.8	46.8
Lacey	103.1	28.1	32.6	3.9	51.7	37.7

†Lodging of 1 = no lodging and 9 = severe lodging.

‡DON data collected in inoculated and mist-irrigated nurseries and provided by Dr. Paul Schwarz, NDSU.

## MALTING QUALITY CHARACTERISTICS:

North Dakota Quality Tests (2007-2010)†								
Entry	Plump		Wort		Diastatic power	$\alpha$ - Amylase (20° DU)	Wort	
	Protein (%)	kernels (%)	Extract (%)	protein (%)	S/T (%)		$\beta$ -glucan (ppm)	
Sta. years	15	19	14	14	14	14	14	14
2ND2527 6	12.1	93.5	82.1	5.50	47.6	120	86.3	162
Conlon	13.7	95.5	80.5	5.23	39.7	135	73.9	416
Pinnacle	11.8	92.7	82.0	4.98	44.8	107	65.8	237
Lacey	13.9	88.0	79.6	5.66	42.7	186	72.7	129

†Data courtesy of the USDA-ARS Cereal Crops Research Unit, Madison, WI.